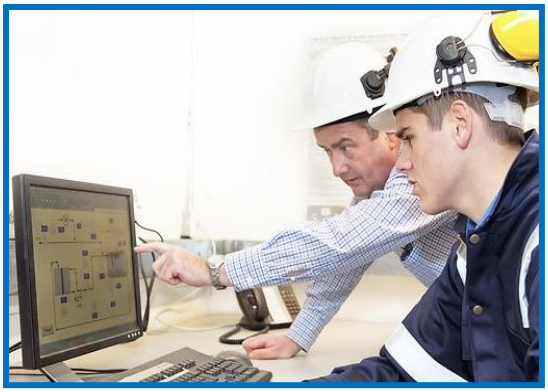
COURSE OVERVIEW PE0074
HYSYS Simulation & P&ID Generation

Course Title
HYSYS Simulation & P&ID Generation

Course Date/Venue
January 26-30, 2025/Online Virtual Training

Course Reference
PE0074

Course Duration/Credits
Five days/2.0 CEUs/20 PDHs



Course Description

This practical and highly-interactive course includes various practical sessions and exercises. Theory learnt will be applied using our state-of-the-art simulators.

This course is designed to provide participants with a detailed and up-to-date overview of HYSYS Simulation and P&ID Generation. It covers the Aspen HYSYS software and its key features, capabilities and applications in industry; the process simulation and its importance in process design and optimization; the role of HYSYS in process simulation; the menus, toolbars and workspace setup of the HYSYS interface; the thermodynamic principles in HYSYS and their significance; setting up a basic simulation, selecting chemical components and defining process streams; building process flow diagrams (PFDs) covering key elements of a PFD; and aligning and organizing process flows.

Further, the course will also discuss the feed preparation, defining feed streams and boundary conditions and working with multiple feed sources; the modeling heat exchangers and pump and compressor simulation; the separator equipment and types of reactors available in HYSYS; the distillation column simulation, energy integration and optimization and dynamic simulation; the simulating pipeline flows in HYSYS and customizing simulation templates; and performing sensitivity analysis in HYSYS.

During this interactive course, participants will learn the basics of P&ID and creating P&IDs from HYSYS simulations; the equipment specification in P&IDs, line sizing, valve selection, instrumentation and control, compliance and standards; the advanced simulation tools in HYSYS and completed P&IDs; the importance of HAZOP in P&ID design, document safety features in P&IDs; and the process for efficiency and cost.

Course Objectives

Upon the successful completion of this course, each participant will be able to:-

- Apply and gain an in-depth knowledge on HYSYS simulation and P&ID generation
- Discuss the Aspen HYSYS software and its key features, capabilities and applications in industry as well as the process simulation and its importance in process design and optimization
- Explain the role of HYSYS in process simulation and identify the menus, toolbars and workspace setup of the HYSYS interface
- Discuss the thermodynamic principles in HYSYS and their significance
- Set-up a basic simulation, select chemical components and define process streams
- Build process flow diagrams (PFDs) covering key elements of a PFD and aligning and organizing process flows
- Discuss feed preparation, defining feed streams and boundary conditions and working with multiple feed sources
- Apply modeling heat exchangers and pump and compressor simulation
- Recognize the separator equipment and types of reactors available in HYSYS
- Identify distillation column simulation, energy integration and optimization and dynamic simulation
- Illustrate simulating pipeline flows in HYSYS, customize simulation templates and perform sensitivity analysis in HYSYS
- Discuss the basics of P&ID as well as create P&IDs from HYSYS simulations
- Determine equipment specification in P&IDs, line sizing, valve selection, instrumentation and control, compliance and standards
- Carryout advanced simulation tools in HYSYS and review completed P&IDs
- Discuss the importance of HAZOP in P&ID design, document safety features in P&IDs and optimize the process for efficiency and cost

Who Should Attend

This course provides an overview of all significant aspects and considerations of HYSYS simulation and P&ID generation for process engineers, chemical engineers, project managers, plant operators and technicians, decision-makers, interest in process design and computer skills.

Training Methodology

All our Courses are including **Hands-on Practical Sessions** using equipment, State-of-the-Art Simulators, Drawings, Case Studies, Videos and Exercises. The courses include the following training methodologies as a percentage of the total tuition hours:-

30% Lectures
20% Practical Workshops & Work Presentations
30% Hands-on Practical Exercises & Case Studies
20% Simulators (Hardware & Software) & Videos

In an unlikely event, the course instructor may modify the above training methodology before or during the course for technical reasons.

Virtual Training (If Applicable)

If this course is delivered online as a Virtual Training, the following limitations will be applicable:-

Certificates	Only soft copy certificates will be issued to participants through Haward's Portal. This includes Wallet Card Certificates if applicable
Training Materials	Only soft copy Training Materials (PDF format) will be issued to participant through the Virtual Training Platform
Training Methodology	80% of the program will be theory and 20% will be practical sessions, exercises, case studies, simulators or videos
Training Program	The training will be for 4 hours per day starting at 0930 and ending at 1330
H-STK Smart Training Kit	Not Applicable
Hands-on Practical Workshops	Not Applicable
Site Visit	Not Applicable
Simulators	Only software simulators will be used in the virtual courses. Hardware simulators are not applicable and will not be used in Virtual Training

Course Fee

US$ 2,750 per Delegate + **VAT**

Course Certificate(s)

Internationally recognized certificates will be issued to all participants of the course who completed a minimum of 80% of the total tuition hours.

Certificate Accreditations

Certificates are accredited by the following international accreditation organizations: -

- British Accreditation Council (BAC)

  Haward Technology is accredited by the **British Accreditation Council** for **Independent Further and Higher Education** as an **International Centre**. BAC is the British accrediting body responsible for setting standards within independent further and higher education sector in the UK and overseas. As a BAC-accredited international centre, Haward Technology meets all of the international higher education criteria and standards set by BAC.

- The International Accreditors for Continuing Education and Training (IACET - USA)

  Haward Technology is an Authorized Training Provider by the International Accreditors for Continuing Education and Training (IACET), 2201 Cooperative Way, Suite 600, Herndon, VA 20171, USA. In obtaining this authority, Haward Technology has demonstrated that it complies with the **ANSI/IACET 2018-1 Standard** which is widely recognized as the standard of good practice internationally. As a result of our Authorized Provider membership status, Haward Technology is authorized to offer IACET CEUs for its programs that qualify under the **ANSI/IACET 2018-1 Standard**.

  Haward Technology's courses meet the professional certification and continuing education requirements for participants seeking **Continuing Education Units** (CEUs) in accordance with the rules & regulations of the International Accreditors for Continuing Education & Training (IACET). IACET is an international authority that evaluates programs according to strict, research-based criteria and guidelines. The CEU is an internationally accepted uniform unit of measurement in qualified courses of continuing education.

  Haward Technology Middle East will award **2.0 CEUs** (Continuing Education Units) or **20 PDHs** (Professional Development Hours) for participants who completed the total tuition hours of this program. One CEU is equivalent to ten Professional Development Hours (PDHs) or ten contact hours of the participation in and completion of Haward Technology programs. A permanent record of a participant's involvement and awarding of CEU will be maintained by Haward Technology. Haward Technology will provide a copy of the participant's CEU and PDH Transcript of Records upon request.

Course Instructor(s)

This course will be conducted by the following instructor(s). However, we have the right to change the course instructor(s) prior to the course date and inform participants accordingly:

Mr. Manuel Dalas, PEng, MSc, BSc, is a **Senior Process Engineer** with almost **30 years** of industrial experience within the **Oil & Gas**, **Refinery**, **Petrochemical** and **Refinery** industries. His expertise widely includes in the areas of **Aspen HYSYS Training**, **Refresher**, **EDR-Exchanger Design** & **Rating**, **Advanced** & **Dynamic Simulation**, **Process Engineering & Systems Failure** Analysis, **Equipment & Mechanical Integrity**, **Process Failure** Prevention, **Engineering Modifications & Systems Failures**, Root Cause Failure Analysis (**RCFA**) Techniques, **Methodology Selection** based on Specific Scenarios, **Process Plant** Optimization, **Revamping & Debottlenecking**, **Process Plant** Troubleshooting & Engineering Problem Solving, **Process Plant** Operations, **Mass & Material Balance**, **Oil & Gas Processing**, **Process Plant** Performance & Efficiency, **Crude Distillation** Process Saturated Gas Process Technology, **Crude Dehydration & Desalting**, **Crude** Stabilization Operations, **Heat Exchangers & Fired Heaters** Operation & Troubleshooting, **Pressure Vessels** Maintenance & Operation, **Piping Support**, **Ironworks**, **Rotating & Static Equipment** (**Pumps**, **Valves**, **Boilers**, **Pressure Vessels**, **Tanks**, **Bearings**, **Compressors**, **Pipelines**, **Motors**, **Turbines**, **Gears**, **Seals**), **Hydrogen Sulphide Stripping**, **Crude Oil De Salting** Process, **Gas Conditioning**, **NGL Recovery & NGL Fractionation**, **Flare** Systems, Pre-Fabrication of **Steel Structure**, Alloy Piping Pre-Fabrication, **Vertical Columns/Pressure Vessels**, **Distillation Column**, **Steel Structures**, **Construction** Management, **Building** Structures and **Electrical-Mechanical Equipment**. Currently, he is the **Technical Consultant** of the **Association of Local Authorities** of **Greater Thessaloniki** wherein he oversees mechanical engineering services while focusing on system reviews and improvements. His role involves a strategic approach to enhancing operational efficiencies and implementing robust solutions in complex engineering environments.

During his career life, Mr. Dalas has gained his practical and field experience through his various significant positions and dedication as the **Technical Manager**, **Construction Manager**, **Senior Process Engineer**, **Process Safety Engineer**, **Process Design Engineer**, **Project Engineer**, **Production Engineer**, **Construction Engineer**, **Consultant Engineer**, **Technical Consultant**, **Safety Engineer**, **Mechanical Engineer**, **External Collaborator**, **Deputy Officer** and **Senior Instructor/Trainer** for various companies including the Alpha Astika, Anamorfosis Technical Firm, EKME, ASTE, Elof Consulting and Hypergroup.

Mr. Dalas is a **Registered Professional Engineer** and has a **Master's** degree in **Energy System** from the **International Hellenic University** and a **Bachelor's** degree in **Mechanical Engineering** from the **Mechanical Engineering Technical University**, **Greece** along with a **Diploma** in **Management & Production Engineering** from the **Technical University** of **Crete**. Further, he is a **Certified Internal Verifier/Assessor/Trainer** by the **Institute of Leadership and Management** (**ILM**), a **Certified Project Manager Professional** (**PMI-PMP**), a **Certified Instructor/Trainer**, a **Certified Energy Auditor** for **Buildings**, **Heating & Climate Systems**, a **Member** of the **Hellenic Valuation Institute** and the **Association of Greek Valuers** and a **Licensed Expert Valuer Consultant** of the **Ministry of Development and Competitiveness**. He has further delivered numerous trainings, courses, seminars, conferences and workshops internationally.

Course Program

The following program is planned for this course. However, the course instructor(s) may modify this program before or during the workshop for technical reasons with no prior notice to participants. Nevertheless, the course objectives will always be met:

Day 1: ***Sunday, 26th of January 2025***

0930 – 0940	*Registration, Coffee, Welcome & Introduction*
0940 – 0945	***PRE-TEST***
0945 – 1010	***Introduction to HYSYS*** *Overview of Aspen HYSYS Software • Key Features & Capabilities • Applications in Industry • System Requirements & Installation*
1010 – 1015	*Break*
1015 – 1100	***Understanding Process Simulation*** *What Is Process Simulation? • Importance in Process Design & Optimization • Common Tools & Software Used in Industry • Role of HYSYS in Process Simulation*
1100 – 1130	***User Interface & Navigation*** *Overview of the HYSYS Interface • Menus, Toolbars & Workspace Setup • Shortcut Keys & Customization • Navigating Between Modules & Tools*
1130 – 1210	***Thermodynamic Principles in HYSYS*** *Thermodynamic Properties & their Significance • Selecting the Right Property Package • Understanding Equations of State (e.g., Peng-Robinson, SRK) • Sensitivity of Results to Thermodynamic Models*
1210 – 1215	*Break*
1215 – 1245	***Setting Up a Basic Simulation*** *Creating a New Simulation Case • Inputting Basic Process Data • Connecting Components & Defining Streams • Saving & Managing Simulation Files*
1245 – 1325	***Component Selection & Stream Definitions*** *Selecting Chemical Components • Defining Process Streams • Inputting Stream Properties (e.g., Temperature, Pressure) • Understanding Stream Status (Calculated versus Specified)*
1325 – 1330	***Recap*** *Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today and Advise Them of the Topics to be Discussed Tomorrow*
1330	*End of Day One*

Day 2: ***Monday, 27th of January 2025***

0930 – 0945	***Building Process Flow Diagrams (PFDs)*** *Key Elements of a PFD • Adding Equipment to the Flowsheet • Connecting Streams Between Equipment • Aligning & Organizing Process Flows*
0945 – 1015	***Feed Preparation*** *Defining Feed Streams & Boundary Conditions • Working with Multiple Feed Sources • Preparing Streams for Equipment Entry • Sensitivity Analysis for Feed Variability*
1015 – 1020	*Break*
1020 – 1130	***Modeling Heat Exchangers*** *Types of Heat Exchangers in HYSYS • Defining Heat Duties & Specifications • Selecting Heat Transfer Models • Troubleshooting Common Heat Exchanger Issues*

1130 – 1210	***Pump & Compressor Simulation*** *Defining Pump/Compressor Performance Curves • Inputting Operational Constraints • Understanding Efficiency & Power Requirements • Performing Sensitivity Analysis for Pressure Changes*
1210 – 1215	*Break*
1215 – 1245	***Separator Equipment*** *Modeling Three-Phase Separators • Understanding Liquid-Vapor Separation Principles • Inputting Design Specifications • Optimizing Separator Performance*
1245 – 1325	***Reactors in HYSYS*** *Types of Reactors Available in HYSYS • Modeling Chemical Reactions & Stoichiometry • Inputting Kinetic Data • Conducting Reactor Sensitivity Analysis*
1325 – 1330	***Recap*** *Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today and Advise Them of the Topics to be Discussed Tomorrow*
1330	*End of Day Two*

Day 3: ***Tuesday, 28th of January 2025***

0930 – 0945	***Distillation Column Simulation*** *Types of Distillation Columns • Specifying Column Feed & Stages • Inputting Column Specifications (Reflux Ratio, Tray Efficiency) • Troubleshooting Convergence Issues*
0945 – 1015	***Energy Integration & Optimization*** *Identifying Heat Integration Opportunities • Modeling Energy-Efficient Processes • Using Pinch Analysis for Optimization • Analyzing Energy Savings in Simulations*
1015 – 1020	*Break*
1020 – 1130	***Dynamic Simulation Overview*** *Differences Between Steady-State & Dynamic Simulation • Applications of Dynamic Simulation • Setting Up Basic Dynamic Cases • Transitioning Between Steady-State & Dynamic Modes*
1130 – 1210	***Pipeline Modeling*** *Simulating Pipeline Flows in HYSYS • Defining Pipeline Lengths, Diameters & Roughness • Accounting for Pressure Drop & Flow Regimes • Using the Pipeline Module for Detailed Analysis*
1210 – 1215	*Break*
1215 – 1245	***Customizing Simulation Templates*** *Using Templates for Recurring Simulations • Modifying Default Settings for Efficiency • Saving Templates for Future Use • Sharing Templates Across Teams*
1245 – 1325	***Sensitivity Analysis & Case Studies*** *Performing Sensitivity Analysis in HYSYS • Analyzing Process Response to Parameter Changes • Case Study: Simple Refinery Process • Discussing Results & Learning Points*
1325 – 1330	***Recap*** *Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today and Advise Them of the Topics to be Discussed Tomorrow*
1330	*End of Day Three*

Day 4: Wednesday, 29th of January 2025

0930 – 0945	***P&ID Basics*** *What Is a P&ID? • Difference Between PFDs & P&IDs • Symbols & Notations Used in P&IDs • Importance in Process Safety & Operation*
0945 – 1015	***Creating P&IDs from HYSYS Simulations*** *Extracting Data from HYSYS Flowsheets • Mapping HYSYS Elements to P&ID Components • Tools for Generating P&IDs • Integrating HYSYS with CAD Software*
1015 – 1020	*Break*
1020 – 1130	***Equipment Specification in P&IDs*** *Specifying Pumps, Compressors & Heat Exchangers • Using Vendor Data in P&ID Design • Assigning Equipment Tags & IDs • Ensuring Compatibility with Process Data*
1130 – 1210	***Line Sizing & Valve Selection*** *Guidelines for Line Sizing • Adding Valves & Control Elements to P&IDs • Specifying Valve Types & Actuators • Ensuring Consistency with HYSYS Simulations*
1210 – 1215	*Break*
1215 – 1245	***Instrumentation & Control*** *Identifying Key Control Loops • Adding Instrumentation to P&IDs • Integrating Control Philosophies • Ensuring Operability & Safety*
1245 – 1325	***Compliance & Standards*** *Adhering to Industry Standards (e.g., ISA, API) • Ensuring Compliance with Regulatory Requirements • Documenting Revisions & Changes • Conducting P&ID Reviews*
1325 – 1330	***Recap*** *Using this Course Overview, the Instructor(s) will Brief Participants about the Topics that were Discussed Today and Advise Them of the Topics to be Discussed Tomorrow*
1330	*End of Day Four*

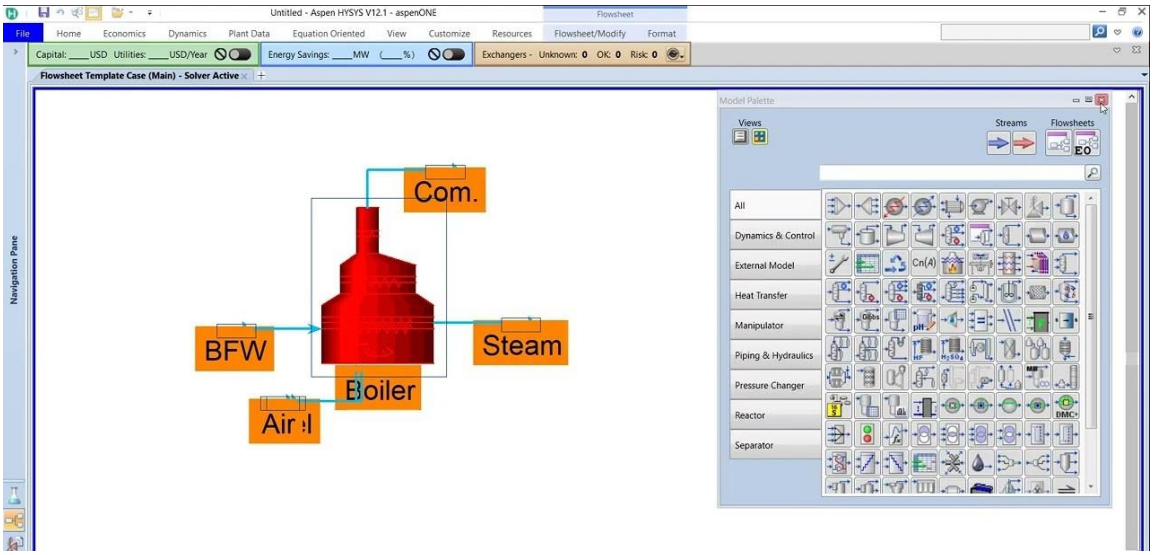
Day 5: Thursday, 30th of January 2025

0930 – 0945	***Advanced Simulation Tools in HYSYS*** *Using the Aspen Plus-HYSYS Bridge • Customizing Property Methods • Using Excel & VBA for Automation • Exploring Plugins & Extensions*
0945 – 1015	***P&ID Review & Finalization*** *Reviewing Completed P&IDs • Conducting a Cross-Check with Simulations • Addressing Design Reviews & Feedback • Preparing P&IDs for Handover*
1015 – 1020	*Break*
1020 – 1130	***Hazard & Operability Study (HAZOP)*** *Importance of HAZOP in P&ID Design • Identifying & Mitigating Risks • Documenting Safety Features in P&IDs • Example of a HAZOP Session*
1130 – 1210	***Simulation Optimization Project*** *Defining a Real-World Simulation Case • Optimizing the Process for Efficiency & Cost • Comparing Baseline & Optimized Results • Presenting Findings & Recommendations*
1210 – 1215	*Break*

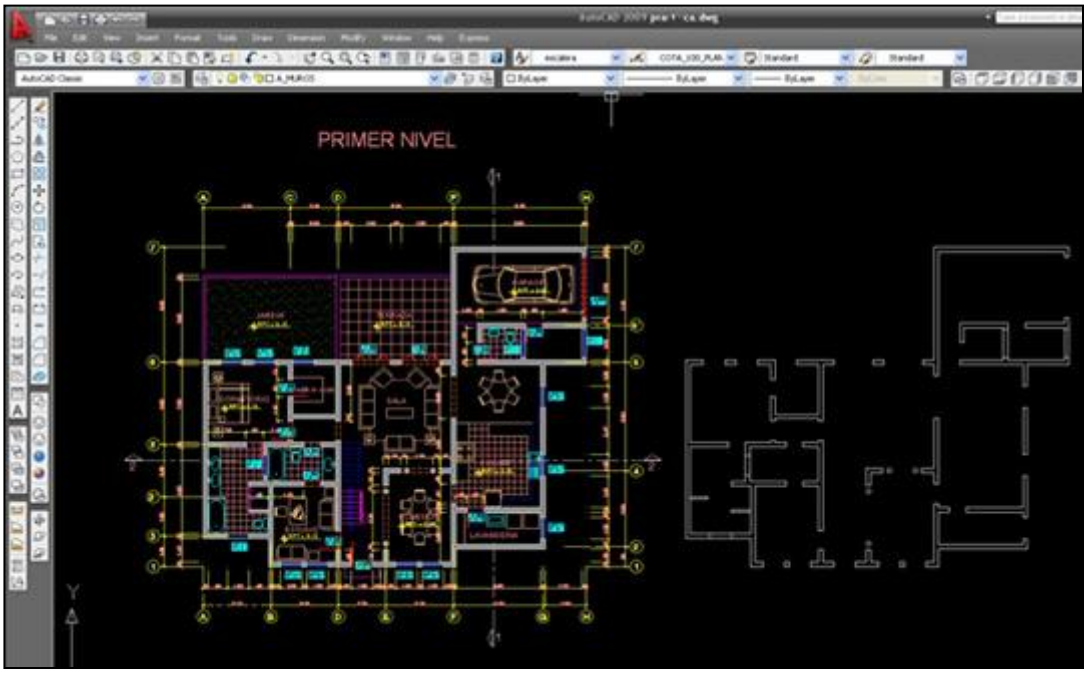
1215 – 1310	***Final Project: HYSYS & P&ID Integration*** *Participants Work on a Project Integrating Simulation & P&ID • Teams Develop a Process Simulation & Corresponding P&ID • Peer & Instructor Reviews • Presentation of Final Designs*
1310 – 1315	***Course Conclusion*** *Using this Course Overview, the Instructor(s) will Brief Participants about the Course Topics that were Covered During the Course*
1315 – 1330	***POST-TEST***
1330	*Lunch & End of Course*

Simulator (Hands-on Practical Sessions)

Practical sessions will be organized during the course for delegates to practice the theory learnt. Delegates will be provided with an opportunity to carryout various exercises using our state-of-the-art "ASPEN HYSYS" simulator and "AutoCAD".



ASPEN HYSYS V14 Simulator



AutoCAD

Course Coordinator

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